

# SCIENCE & GOVERNMENT REPORT

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## NIH Revokes Co-Author's Grant

### Secret Service Says Data Faked in Baltimore Case

The long-standing stonewall defense in the so-called Baltimore case was tumbled this week by Congressional testimony from Secret Service document examiners and the chief investigator of scientific misconduct for the National Institutes of Health.

At a hearing May 14, the Secret Service agents presented a tale of fabricated scientific data, while the NIH official reported that the central figure in the case, Thereza Imanishi-Kari, of Tufts University, has refused to cooperate with the NIH investigation. The NIH official, Suzanne Hadley, Acting Director of the NIH Office of Scientific Integrity, also confirmed that NIH has terminated a grant held by Imanishi-Kari because of "significant questions about her fitness to hold an NIH grant."

Imanishi-Kari declined an invitation to testify at the hearing, chaired by Rep. John Dingell (D-Mich.), chairman

of the Energy and Commerce Committee and its Subcommittee on Oversight and Investigations. Her lawyer informed Dingell that Imanishi-Kari would not appear unless the Congressional committee fulfilled her request for 24 items of information concerning the inquiry. Committee sources dismissed the request as a legalistic wile designed to bog the inquiry in endless disputes about whether all the sought-after information had actually been provided. Baltimore was not invited to testify and did not attend.

In a letter telling Dingell that Imanishi-Kari would not testify without the requested information, her attorney denounced the Secret Service findings as "insignificant and irrelevant." On the Friday preceding the Monday hearing, Imanishi-Kari held a 90-minute press conference at which she befuddled reporters with long, often-incoherent ha-

(Continued on Page 2)

### SSC vs. Other Needs: Bromley Collides with Senate Skeptics

*To the several subsidiary titles that D. Allan Bromley holds in his role as Science Adviser to the President, addition should be made of Super Salesman for the Superconducting Super Collider, which Bromley sold hard April 24 at a hearing of the Senate Subcommittee on Energy Research and Development of the Committee on Energy and Natural Resources. Following are choice exchanges with Committee Chairman J. Bennett Johnston (D-La.) and Senator Dale Bumpers (D-Ark.).*

**Johnston.** Is there any real hope that one-third of the cost of this will be put up by foreign sources?

**Bromley.** I believe that there is. Not one-third by foreign sources, but one-third by non-federal sources. If one takes the Texan commitment [\$1 billion] and then asks, is it conceivable that we could get the remainder of one-third of the presently estimated total, I would say that, in terms of total commitment, yes, it is feasible.

**Johnston.** That's about \$1 billion.

**Bromley.** Yes.

**Johnston.** And could we get them to do anything except the high-tech part of it? You've just identified the importance of the magnets, the manufacturing technology. So we give away or we get our foreign participation from the most important part. . . . Why not foreign participation in digging ditches?

**Bromley.** Frankly at this point, sir, it's too late for us to do

(Continued on Page 4)

### In Brief

Popular themes on the science-policy circuit these days: accusing Japan of thriving on foreign R&D and proposing that it send money to US universities. Speaking to the National Space Symposium, Deputy Secretary of Commerce Thomas J. Murrin noted that Japan spends only \$1 billion on space but he warned that "time and time again the Japanese have proven themselves extraordinarily proficient at gathering and putting to practical use the results of R&D conducted in the United States and elsewhere. . . ."

The send-cash theme was recently sounded by Frank Press, President of the National Academy of Sciences, who told the NAS annual meeting that after all US academe has done in educating Japanese, "a major program of support from Japan for renewal of American science and engineering laboratories would be viewed very favorably by the American public and its political representatives." Press suggested \$100 million a year. In unmarked bills?

A senior official of the Technology Administration in the Department of Commerce recently looked a bit pained when a well-wisher spoke about TA's mandate to boost high-tech industry. "Look what happened to Craig Fields," he said, referring to the ex-chief of the Defense Advanced Research Projects Agency, ousted by Bush's free-marketeers for pumping help into sagging firms and promising technologies.

Going metric has been a lost cause in the US, despite legislation decreeing conversion timetables. But the Department of Energy is signing up. All measurements for the Superconducting Super Collider will be in metric measure.

## ... "Large Portions" of Data False, Agent Testifies

(Continued from Page 1)

rangues loosely or not at all related to their questions. Following the hearing, which she observed as a member of the audience, she held another press conference.

After receiving the testimony of the Secret Service and NIH witnesses, Dingell (D-Mich.) said the information collected by his Committee would be referred to the Justice Department for possible criminal prosecution.

The case arises from a 1986 paper in *Cell* co-authored by Nobelist David Baltimore, head of the Whitehead Institute for Biomedical Research, at MIT, and Imanishi-Kari, then at MIT, now at Tufts (SGR May 1, 1989). A postdoctoral fellow at MIT, Margot O'Toole, complained that data for Imanishi-Kari's portion of the paper had been fabricated and that the *Cell* paper contained errors and unsupported claims. O'Toole also charged MIT and Tufts with conducting sham inquiries into her allegations, and said that her career prospects had been derailed because she had disputed the paper.

Baltimore's contribution to the paper was not disputed, but he stepped forward to defend the jointly produced publication. Since he's a celebrated figure in American science—soon to become President of Rockefeller University—it became the Baltimore case. It also became Baltimore vs. Dingell, as the powerful chairman of the House Energy and Commerce Committee charged that the case illustrated science's unwillingness to police itself. Baltimore responded by depicting Dingell as an anti-science McCarthyite.

At a hearing held by Dingell in May 1989, Baltimore rode that theme to a resounding public-relations victory, despite Secret Service testimony that Imanishi-Kari's laboratory notebooks for the disputed experiment contained many pages produced long after the experiment was conducted. Imanishi-Kari insisted that the seeming discrepancies were attributable to sloppy record keeping and catch-up note writing.

The Baltimore forces then dug in and, wherever possible, declined cooperation with Dingell's efforts to go further into the case. They applied the same tactic to NIH, which is in the process of a second look at the *Cell* paper after an earlier NIH investigative panel concluded that the paper contained "serious errors of misstatement and omission as well as lapses in scientific judgment and interlaboratory communication" (SGR December 1, 1988). That finding confirmed some of O'Toole's reservations about the paper, but she insisted there were more—and NIH agreed to look further.

The latest hearing brought out the results of a new line of inquiry by the Secret Service, this one concerning the gamma-counter tapes in the notebooks that Imanishi-Kari says underpin the published paper. While Imanishi-Kari claimed that delays might have occurred in writing up her experiments, counter tapes are produced simultaneously with the experiment, which in the *Cell* paper concerned the effects of foreign genes introduced into transgenic mice.

John W. Hargett, Chief Document Examiner of the Secret Service's Forensic Services Division, explained that four tape machines were available to Imanishi-Kari and other researchers in the building where she worked at MIT. The machines from which specific tapes were produced were easily identifiable from type characteristics, he said. Paper and the declining density of ink from the typewriter-like ribbons provided a basis for matching Imanishi-Kari's tapes with tapes of known dates provided by other researchers, he said.

"Briefly," the Secret Service agent testified, "we determined that many of the counter tapes found in Imanishi-Kari's... notebook are not consistent with authentic samples cataloged and dated by other researchers on or around the dates purported. It is interesting to note," he continued, "that many of these pages containing counter tapes are part of, or connected to, pages previously reported [by the Secret Service] as questionable. Therefore, as a result of the first and second examinations, it is our opinion that a large portion of this notebook is not authentic with respect to time."

Rep. Ron Wyden (D-Ore.), the only Congressman besides Dingell at the hearing, asked Hargett whether the tapes had been "fabricated." Hargett replied, "It has that appearance." Another Secret Service forensic specialist, Larry F. Stewart, said, "Large portions of the notebook, at least one-third, are false." Wyden asked whether Imanishi-Kari has provided "false data" to NIH and the Committee. "Yes, sir," answered the agent.

A staff counsel for the Republican minority, Thomas C. Montgomery, questioned the agents about the operations of the tape machines, but didn't dent their insistence that the tapes in the notebooks were not produced when the experiments were said to have been conducted. The agents did concede, however, that they were not competent to assess the scientific content of the paper or the relationship of the notebooks to the published paper.

Suzanne Hadley, Acting Director of the NIH Office of

(Continued on Page 3)

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## ... "Questions of Fitness" Led to Grant Withdrawal

(Continued from Page 2)

Scientific Integrity (OSI) through much of the current investigation of the paper, was asked by Wyden to describe the degree of cooperation OSI had received from Imanishi-Kari.

"Mr. Wyden," she replied, "it is the case that we have made a number of requests of Dr. Imanishi-Kari and her counsel for cooperation on various aspects of the investigation. Those requests have not been honored. Cooperation has not been what we would have hoped."

Dingell asked whether Imanishi-Kari's responses were in writing. Hadley replied, "Some were in writing, and to some there was no response at all."

Hadley related that since May 1989, "at least five or six requests" had been made for "various pieces of information or cooperation in various aspects." None had been responded to, she said. Among the requests ignored, Hadley said, was one for Imanishi-Kari to index her notebooks, "which we regarded as very important," the NIH official testified. "We requested information about creation of the *Cell* paper," she continued, "we requested information about other data that might support the *Cell* paper, and other items such as that."

Wyden noted that on April 19, Hadley had written to Imanishi-Kari's attorney that "the situation is one in which there is a mounting body of evidence that suggests there may be very serious problems with the authenticity of key sets of data" in the paper. "Against this body of evidence," the letter continued, "we have no communication whatsoever with Dr. Imanishi-Kari."

In further exchanges with Wyden, Hadley acknowledged that the data whose authenticity was now disputed by the Secret Service had been accepted by the NIH investigators who had conducted the first phase of the inquiry.

"So, much of the support for the authenticity, accuracy, and validity of the *Cell* paper is this unpublished tape," Wyden stated.

Hadley agreed, later adding that the long inquiry into the affair is regarded "as a vitally important effort, not only for the paper itself but for the credibility of biomedical research."

Dingell then inquired about the revocation of one of two NIH grants awarded to Imanishi-Kari. The action was taken, Hadley explained, "Because the evidence that was developing in the investigation raised significant questions about her fitness to hold a PHS [Public Health Service] research grant."

Referring to "falsification of records" as grounds for revoking an NIH grant, Dingell asked, "Can you rule that out?"

Hadley replied, "That particularly was not included but it was not ruled out."

Dingell asked why one grant was revoked but another remained in force. Hadley replied, "We were advised that we were not able to terminate that." The grant still in effect,

she explained, was awarded in January and runs through December. "Doesn't one hand know what the other is doing at NIH?" Dingell asked.

Hadley replied, "The Office of Scientific Integrity advised Dr. [William] Raub [Acting Director of NIH] about the evidence that we had accumulated or were accumulating. And that was toward the end of March. At that time, he in turn then advised the director of the funding institute." The evidence in March, she explained, was stronger than the evidence available in January, when the second grant was awarded.

Wyden then recommended that the Committee refer the case to the US Attorney, expressing concern "that a number of criminal statutes could have been violated by Dr. Imanishi-Kari, including submitting false documents to the NIH and the Subcommittee, making false statements to the NIH" and various other offenses. Dingell agreed, saying he would direct the staff to carry out the task. And the hearing ended.

Still to come is the report of the five-member committee of outside specialists appointed by NIH to conduct NIH's second investigation of the *Cell* paper. Their product is reported due in a few months.

For the biomedical establishment, and the toady apologists in the captive science press, the Baltimore case has acquired the outlines of a major catastrophe. Perhaps independently of these events, perhaps not, Frank Press, the non-boat-rocking President of the National Academy of Sciences, took note of the scientific misconduct issue in his annual address to the members.

Expressing confidence that "fraud on a topic of importance" will eventually be exposed, Press added: "However, it does not follow that we should stonewall those who call for safeguards."—DSG

### US Attorney Following the Case

SGR has learned that the Congressional inquiry concerning the *Cell* paper has attracted the interest of the US Attorney's office for Maryland, which includes NIH in its jurisdiction.

In the annals of scientific misconduct, the Maryland office, headed by US Attorney Breckinridge C. Willcox, is notable for what is said to be the first conviction of a university scientist, Stephen Breuning, on charges arising from fabricated scientific data. He pleaded guilty in 1988 to falsifying information on grant-renewal applications to the National Institute of Mental Health. He was sentenced to a suspended two-year prison term, five years probation, 60 days work-release residence in a halfway house, and restitution of \$11,352 in salary to the University of Pittsburgh, where he was employed when some of his misdeeds were committed (SGR, December 15, 1988).

Even before Rep. Dingell said the US Attorney would be asked to look into the Baltimore case, Breckinridge's office, SGR is advised, had asked to be kept informed.

## ... Bromley Says SSC Will Produce Great Benefits

(Continued from Page 1)

that with the SSC, because our foreign collaborators are proud individuals. If they feel that they weren't involved with the conception, they're not about to come dig our ditches for us. I think there's no question that they will want to be involved in some of the high technology. . . .

And I think what we really are faced with is the need, when [DOE] Deputy Secretary [W. Henson] Moore and his party heads off at the end of May to negotiate foreign participation, that we have to be rather tough in our negotiating stance, because we are making available a very major facility that will make it unnecessary for other countries to invest themselves. And so they're not doing this out of altruism. They're doing it because they want access to this facility when it's functioning finally. And so we can negotiate under just what conditions that access will be made available. I don't think we have to give away what we feel is in our own best interest to retain. . . .

**Bumpers.** Dr. Bromley, I am not an enthusiastic supporter of this project. That's the voice of a layman, number one, who doesn't understand it; number two, the voice of a fiscal conservative who wonders whether or not we can afford it. But I don't understand. . . . I want to ask you, what do we get? We discover the nature of mass today. What are the benefits? I know there's a lot of intellectual curiosity, which I wholly appreciate.

**Bromley.** When you start dealing with truly fundamental research of this kind, the most fundamental known to us, it is simply not possible for me to specify for you the immediate benefits. What I would have to do is fall back on, first of all, the history aspects, which show that every new discovery of this kind that we have ever made has, in surprising fashion and in a surprisingly short time, turned out to have the most real applications.

For example. . . positron-emission tomography. Positrons were discovered in the old, crude cyclotron when I was a youngster, and we had great fun playing with them, because they were a particular new kind of radioactivity. . . . If you had come to me and asked me, why don't you, Dr. Bromley, come up with a device which will allow us, without any penetration of the human person whatever, to tell us in real time exactly what that individual's brain is doing. . . . I would certainly not have gone out and built a cyclotron. But that, sir, is exactly what happened. . . .

And here is this machine, that was invented by a bunch of physicists who were playing around with a cyclotron because they were curious, that tells you this, precisely, is the part of the brain that's functioning, and if it isn't functioning, you have big problems and perhaps we can tell you why and we can identify abnormalities, we can probe so the surgeon knows, within fractions of a millimeter, where he has to go to make corrections. . . . This is the kind of thing that comes from this kind of research. But I can't promise in any particular example.

And I would have to say, sir, that this, again, is the sort of thing that is on the absolute frontier of human knowledge. And there is nothing more on the frontier than what the SSC can and will do. It's part of our human nature to go after it because it's there.

**Bumpers.** Well, it's very exotic and very interesting. But one of the choices we have to make here in the Congress is—for example, let's take the space program. Nobody will turn the clock back on the space program. I'd turn it back on SDI [Strategic Defense Initiative]. But in each of those instances, we obviously get a lot of technical fallout, a lot of scientific knowledge. But we have to decide would we have been better off to have sought that knowledge specifically at a much reduced cost other than going after this big global picture, where we get these things as a sort of a fallout.

On this particular case, you've got the CERN project in Switzerland. . . . Now, you've suggested that is simply not big enough to get the right answer or the ultimate answer that we want. But let me go back to the cost thing and compare what we are about to undertake with the CERN project. What if the CERN project, which is way ahead of us, what if they do discover, for example, enough information that shows us we are either on the wrong track or a tremendous portion of our investment has been wasted and we're going to have to do an additional redesign, just as we have come up with an additional \$2 billion right now. Is that a possibility?

**Bromley.** One can never rule out that something of this kind could conceivably happen, but I would say that, on the basis of the assembled wisdom of all the world's best physicists, most able physicists, the probability of that happening has been judged to be very small. And we are making this investment, we are recommending this investment to you, obviously we would not recommend it to you if we felt there was any significant probability of it being beside the point, being too late, and the Europeans could in fact achieve what we're trying to achieve with their facility. I do not believe that they can. I do not believe that they have sufficient energy. . . .

**Bumpers.** I have a high degree of confidence in you and Professor [Sidney] Drell [Deputy Director, Stanford Linear Accelerator Center, who also testified at the hearing], so far as science is concerned. I'm not sure that I have that high a degree of confidence in your fiscal prowess.

**Bromley.** You would be singularly unwise if you did.

**Bumpers.** You expressed, in a rather dangerous way, frankly, your high degree of confidence that this is the ultimate design and that it will work. I think that's rather dangerous, because we got that same high degree of confidence expressed in the same room a year ago. And now we are, one year later, \$2 billion above that figure.

**Bromley.** If I may, Senator, I don't for a moment contradict the statement that you may have got exactly the same statement, but I do submit to you, sir, that the conditions

(Continued on Page 5)



## ... Bumpers: Bush Silent on How to Pay for SSC

(Continued from Page 4)

were different. You were dealing then with a conceptual-design figure. And I understand fully that when people are attempting to sell a project, that particular fact is not overly emphasized. But it is nonetheless the fact we are not dealing with a conceptual-design figure now.

**Bumpers.** I've been a big supporter of the B-2 bomber for the last year. We heard those stories over and over again about how this was the ultimate in penetrating technology, and now we've developed a problem that has nothing to do with penetrability. It's cracks in the tail, because they're using a new kind of material you've never used before. One of the things that perplexes me, or that concerns me about this, is the kind of sense of urgency that you and others are expressing. . . . I question whether or not there is a kind of urgency about this particular scientific knowledge. Maybe not nearly as much urgency as there is to other things.

I don't want to get preachy about this, Dr. Bromley, but we've got the supplemental appropriations bill coming up this week, and I'm having one hell of a time trying to find \$23 million to give people in this country a second measles shot; [plus] \$12 million for [emergency supplies of vaccine for] an outbreak of measles. We have 25 kids dead in Los Angeles from measles in the last 60 days. And I'm having a terrible time trying to come up with that money. One reason we're having trouble getting that \$23 million—I've already located the \$12 million—[is that] in order to get this money, I've got to take it away from somebody else. . . .

Let me ask you another question. The other thing we have to do here is to establish priorities when you're dealing with a limited amount of money, and this kind of research is very expensive. How would you compare your own enthusiasm for this compared to the space station?

**Bromley.** I think that it would be improper for me, sir, to give you my personal view on that. The reason for that, sir, is because I have had an opportunity to sit down with Richard Darman [Director of the Office of Management and Budget], with the President, with Admiral [Richard] Truly [Administrator of NASA], with Admiral [James] Watkins [Secretary of the Department of Energy], and we argued out the relative merits of these and other major projects. And the President then made the decision. These are Presidential decisions, and as a member of the President's team, once he has made that decision, it is my function to make sure that the decision is implemented in the most cost-effective, efficient way that I can.

**Bumpers.** The President wants it all.

**Bromley.** Not all, sir.

**Bumpers.** I'm not sure he even wants this. He hasn't told us how he wants to pay for it. He said, "You fellows figure this out." In his Joint Session State of the Union Address, he says, "I'm happy to report the budget deficit is under control. And next year, the deficit will be \$64 billion." Next year, the deficit will be \$164 billion. It is wildly out of

control. . . . I've got a staff memo here and they didn't know of any way the President proposes to finance this thing.

**Bromley.** Sir, I can only say that, from my own point of view, and I believe it's the President's point of view, that we are bringing this forward to you because we believe that we have. . . . applied work that we expect to have short-term payoff, and on the other hand, the investment in the far-distant future.

This is one of those investments, and we believe that unless we maintain that balance, and that unless we can keep the facilities coming so that our children are going to have the same kind of support to get to the frontiers of nature that our forefathers gave us, so that we could do our research, that we will have lost a leadership that was hard-won and that we still maintain in the world.

We have the strongest science and technology enterprise that the planet has ever seen. And it has been built through your efforts, gentlemen, working with the scientific community. We are the only developed nation in the world where scientific programs are built from the bottom up, built on the enthusiasm, the insight, the drive of the groups of scientists who, coming together, decide that this is the most exciting and important thing we can do. Some of those people work on the very frontiers of our knowledge where it's too early yet to tell you exactly what the return is. . . . Prospectively, I would find it impossible to give that number. But I think history is a reasonable guide.

**Bumpers.** Dr. Bromley, let me say, personally, I have the utmost respect for you as a scientist and as a man of immense integrity. And certainly, my questions were not designed to badger you. It was just to raise some rather simple questions by a layman. Everything has to be put into priority around here. My disagreements with your President are not personal. They are simply based on priorities. Something like 68 percent of the. . . research [money] that the United States government spends is coming out of the Defense Department.

**Bromley.** Sixty-one.

**Bumpers.** Sixty-one. The Japanese spend about two percent of their. . . research on defense and the Germans slightly more than that.

**Bromley.** If I may, sir, of that 61 percent, however, it is worth emphasizing that 92 percent of that total is tied to specific weapon systems, and only 8 percent would fit under the same rubric that is used elsewhere in the government in discussing research and development.

**Bumpers.** I understand those arguments, but when I sit on the Health and Human Resources Subcommittee of the Appropriations Committee and NIH tells me that they have thousands of very good applications for basic medical research and I know that they could easily put \$2 billion more into NIH for that purpose, and the money is simply not available. With me that is really a much higher priority than the SSC.

## Job Changes & Appointments Around Washington

**Reuben Mettler**, retired Chairman and Chief Executive Officer of TRW Inc., has been appointed Chairman of the Manufacturing Forum, a new joint creation of the National Academy of Sciences and the National Academy of Engineering created, they say, at the request of the White House Science Office and NSF. An Academy announcement says the Forum will examine technology, education, management practices, etc. related to manufacturing. The charter membership consists of 26 senior executives from academe, industry, and government. Serving as Director is **Christopher T. Hill**, formerly of the Congressional Research Service Science Policy Research Division in the Library of Congress.

**Thomas E. Everhart**, President of Caltech, has been appointed Chairman of a newly created Secretary of Energy Advisory Board in the Department of Energy. In announcing the appointment, Energy Secretary James Watkins said the Board will report directly to him and its first issues will include review of the Department's efforts to develop a national energy strategy "and an analysis of ways to sustain the Department's national laboratory complex as an intellectual resource for the nation."

**Richard M. Morrow**, Chairman and Chief Executive, Amoco Corp., has been elected Chairman of the National Academy of Engineering, succeeding **John F. Welch Jr.**, Chairman and Chief Executive Officer, General Electric.

Unlike its landlord, the National Academy of Sciences, the Academy of Engineering includes a Chairman in its table of officers. The post, just below the NAE President, regularly goes to a major industrial executive.

**Lewis M. Branscomb** and **Marina von Neumann Whitman** have been appointed to the Technology Assessment Advisory Council of the Congressional Office of Technology Assessment. Branscomb, a veteran of the Washington science-advisory circuit, is a Professor at Harvard's Kennedy School of Government and formerly was a Vice President of IBM; he was nominated for the 10-member Council by Senator Edward Kennedy (D-Mass.), Chairman of the OTA Board. Whitman, General Motors Vice President and Group Executive for Public Affairs, was nominated by Rep. John Dingell (D-Mich.), a member of the OTA Board.

**David Dickson** has been appointed editor of the British weekly *New Scientist*, succeeding **Michael Kenward**, who has resigned, after a decade in the post, to write books and consult. Dickson was serving as the magazine's News Editor and formerly was European correspondent for *Science*.

**Allan R. Hoffman** will leave the National Academy of Sciences at the end of May. He is head of External and Government Affairs and formerly was Executive Director of the Committee on Science, Engineering, and Public Policy. Also at the NAS, **Mitchel B. Wallerstein** has been named Deputy Executive Officer of the National Research Council.

## Letters to the Editor

### Indirect Cost Rates

In SGR March 1, 1990, "Indirect Cost Rates for 'Top Dollar' Universities" refers to the "145 so-called top-dollar universities" and lists only 135. Were 10 universities deleted or was this simply a typographical error?

Additionally, indirect cost rates were referred to as rates which are "calculated as a percentage of the sums that go directly to researchers." Such a statement can be misleading. Indirect costs are real costs and are usually calculated as a percentage of direct costs. Indirect costs normally apply to costs associated with things such as building and equipment use and depreciation, operation and maintenance of physical plant (heating, cooling, lighting, etc.), general administration, sponsored project administration, departmental administration, and library utilization.

**Robert M. Sweazy**  
Vice Provost for Research  
Texas Tech University  
Lubbock, Texas

[Ed. Note. SGR miscounted; 135 institutions appeared on the March 1 "top-dollar" list. But, it turns out, we missed two, which were published in the March 15 issue. SGR and

Sweazy define indirect rates in approximately the same terms. The difference is that SGR noted that "bench scientists gripe that the system absorbs money that belongs in the lab." They may be wrong, but they do so gripe.]

### NSF Audit Report

SGR (November 15, 1989, "First Inspector General Cites a Few Problem Areas at NSF") reported NSF audit results for various organizations, including the American Type Culture Collection (ATCC). Though not identified as such, the results reported for ATCC were only preliminary.

After consultation with the audit personnel and NSF staff, the final audit results were as follows:

- Questioned costs, \$15,325
- Unresolved costs, \$ 0.

ATCC concurred with the final results. After receipt of ATCC's \$15,325 remittance, NSF notified ATCC that the audit was considered officially closed. Please note that the final settlement was approximately \$150,000 less than the preliminary results published in your publication.

**Robert J. Walden**  
Chief Financial Officer  
ATCC  
Rockville, Md.

## More in Print: Space, Math, Grant Swinger Papers

(Continued from Page 8)

difficulty getting adequate support.”

OTA argues that research is not enough: “The real solution—increasing the supply of patient capital to US industry—will require politically tough fiscal policy choices that involve tradeoffs among military, economic, and social goals. If US competitiveness continues to decline,” OTA warns, “it will not be because the United States lost the superconductivity race with Japan, but because policymakers failed to address the underlying problems with long-term, private-sector investment. . . .”

Also from OTA: *Access to Space: The Future of the US Space Transportation System* (GPO Stock No. 052-003-01177-8; \$4.75), latest in a series of OTA reports inspired by Congress’s distress over the absence of coherent space policy, says that agreement on goals must precede development of the means to attain them. OTA concludes that the “current course of steady growth” in civilian and military space programs does not require a new launch system before the year 2010, but says that prudence calls for adding another shuttle orbiter to the present fleet. In developing new ventures, OTA says, the US should seek benefits from industrial competition and foreign cooperation. Listed are 22 previous OTA reports on civilian and military space policy, technology, economics, etc., along with information for ordering copies.

Order from: USGPO, Superintendent of Documents, Washington, DC 20402; tel. 202/783-3238.

*Space Program: Space Debris a Potential Threat to Space Station and Shuttle* (GAO/IMTEC-90-18; 35 pp., no charge), from the General Accounting Office (GAO), Congress’s investigative service, which was asked by the Chairman of the House Science, Space, and Technology Committee to report on NASA’s plans for coping with space litter, which includes, GAO reports, some 24,500 objects of one centimeter or more that pack “the same kinetic energy when striking a spacecraft as would a 400-pound safe traveling at 60 miles an hour.” Though NASA agrees that there’s a problem there, GAO reports, the space station is nonetheless “being designed to meet requirements that greatly underestimate the seriousness of the debris environment.” In a response appended to the GAO report, NASA says it is “paying serious technical and managerial attention to how best to deal with the future hazards posed by space debris.” But the overall tone of the GAO report is skeptical.

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20877; tel. 202/275-6241.

*Renewing US Mathematics: A Plan for the 1990s* (133 pp., \$15), in the standard form of a brief for more federal funds for a research discipline, but this one is notable for a rare look back at whatever happened after a previous call

was issued, in this case, the 1984 *Renewing US Mathematics: Critical Resource for the Future*, the so-called David Report, after its Chairman, Edward E. David Jr., former White House science adviser and industrial R&D executive. In an introductory letter to Frank Press, President of the National Academy of Sciences, which sponsored both reports, David laments academe’s failure to support the 1984 goals and “the inability of the science-policy mechanisms of government to deal decisively with a funding problem as easily soluble and vitally important as the one we pointed out back in 1984.”

Math got only 59 percent of the recommended \$225 million for research and training over the 1984-89 span, the report states. It adds that “the academic foundations of the mathematical sciences research enterprise are as shaky now as in 1984.”

Order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 1-800/624-6242; in Washington, DC: 334-3313. A 9-page summary is available without charge from: National Academy of Sciences, Board on Mathematical Sciences, above street address; tel. 202/334-2421

*The Grant Swinger Papers* (40 pp., \$8.95, three for \$25; add \$2 for overseas orders), new, expanded edition of SGR Editor Greenberg’s collected interviews with the legendary Director of the Center for the Absorption of Federal Funds, plus related materials on the culture of grantland. The pieces appeared originally in *Science*, *The New England Journal of Medicine*, *SGR*, and other publications. Included are “Let’s Hold a Conference,” “Gold in the Greenhouse Effect,” “Cold Fusion and Other Matters,” and “Grant Swinger Surveys the Reign of Reagan.”

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## In Print: Hot Technologies, Materials, Education

*The publications listed are obtainable as indicated—not from SGR.*

**Emerging Technologies: A Survey of Technical and Economic Opportunities** (55 pp., no charge), from the Commerce Department's Technology Administration, slowly coming to life after several years of malign neglect by Reagan and Bush free-marketeers, this report identifies budding technologies that are expected to have major commercial potential, and rates the US position in each versus Japan and Europe. Focused on advanced materials, electronics and information systems, manufacturing systems, and life-sciences applications, the report states that by the year 2000, the US "could lag behind Japan in most emerging technologies and trail the EC in several of them." In apparent deference to the Bush inner circle's opposition to federal tonics for sagging industrial technologies, the report says the list is "not intended to set out a limited set of technologies which the government has pre-selected for support." The text indicates that the sectors invited to pay attention are industry, labor, government, and academe.

Order from: National Institute of Standards and Technology, Technical Report, B-110, Technical Building, Gaithersburg, Md. 20899; tel. 301/975-3780.

**The New Materials Society: Challenges and Opportunities** (Vol. I, "New Materials Markets and Issues," GPO Stock No. 024-004-02211-6; 106 pp., \$8.50. Vol. II, "New Materials Science and Technology," GPO Stock No. 024-004-02212-4; 234 pp., \$15), from the US Bureau of Mines, which describes the volumes as its "most comprehensive report on the subject of advanced materials." Vol. I addresses industrial uses and market forecasts, Vol. II discusses specific new materials, defined as those created since 1960. Included are reviews of federal policy, materials programs in various federal agencies, and international comparisons. The individual sections are by contributors from industry, government, and universities.

Order from: USGPO, Superintendent of Documents, Washington, DC 20402; tel. 202/783-3238.

**The Liberal Art of Science: Agenda for Action** (121 pp., \$12.95), from a study group assembled by the American Association for the Advancement of Science, a cliché-ridden belaboring of the need to put more science into liberal education. Only a glutton for repetitiveness will wade through the main text, which is larded with silliness such as "Liberal education is the most practical form of education" and "The liberally educated person... is inclined to serve the common good, to continue learning after formal education has ended, and to seek meaning in life." Of value, however, are brief reviews of innovative science-education programs at various institutions, including contacts for additional information. In a sequence characteristic of the report industry, the present document was bankrolled by the Carnegie Corporation of New York to provide a follow-up to previous Carnegie-financed reports on education.

Order from: AAAS, Publications, 1333 H St. NW, Washington, DC 20005; tel. 301/645-5643.

**High-Temperature Superconductivity in Perspective** (GPO Stock No. 052-003-01187-5; 127 pp., \$6.50), from the Office of Technology Assessment, illustrating what Congress's own policy-research agency does so well—the gathering and analysis of far-flung, complex data. OTA says federal research agencies responded quickly to the breakthrough in high-temperature superconductivity (HTS) announced in 1986, resulting in R&D spending last year of \$130 million, compared to \$70 million by the Japanese government, and far less by European nations. But, the report points out, Japanese industrial firms far outspend their American competitors in HTS research, "reported more resources devoted to basic research than did US firms," and are not harried about quick returns. Noting that federal labs received 45 percent of government HTS research funds in 1988, the OTA says that "questions remain about whether they should have such a large share of the HTS budget—especially given the scarcity of resources for universities. . . [where] even proven contributors have had

(Continued on Page 7)

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